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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO.       |
|---|-------------|----------------------|------------------------------|------------------------|
| 10/773,804  | 02/06/2004  | Akira Yamanaka       | 17474US02                    | 8463                   |
| 23446 7590 08/02/2007<br>MCANDREWS HELD & MALLOY, LTD<br>500 WEST MADISON STREET<br>SUITE 3400<br>CHICAGO, IL 60661 |             |                      | EXAMINER<br>BAYARD, EMMANUEL |                        |
|   |             |                      | ART UNIT<br>2611             | PAPER NUMBER           |
|   |             |                      | MAIL DATE<br>08/02/2007      | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/773,804 | <b>Applicant(s)</b><br>YAMANAKA ET AL. |  |
|                              | <b>Examiner</b><br>Emmanuel Bayard   | <b>Art Unit</b><br>2611                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2, 5-8, 11-13, 18-19 and 22-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al U.S. Patent No 7,155,180 B2.

As per claims 1, 7 and 18, Kim et al teaches a method for measuring IQ path mismatch in transceivers, the method comprising: estimating a transmitter IQ mismatch in a form of gain and phase response for transmitter I and Q paths sharing a receiver path (see fig.9 element TX and col.2, lines 59-67 and col.3, lines 35-40 and col.6, lines 9-35 and col.10,lines 35-59); and estimating a receiver IQ mismatch in a form of gain and phase response for receiver I and Q paths sharing a signal source (see fig.9 element RX and col.2, lines 59-67 and col.3, lines 35-40 and col.6, lines 9-35 and col.10,lines 35-59).

As per claims 2, 8 and 19 Kim et al teaches wherein estimating a transmitter IQ mismatch and estimating a receiver IQ mismatch further comprises measuring a

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difference in the gain and phase response between the transmitter I and Q paths and between the receiver I and Q paths (see fig.9 element and col.9, lines 40-45).

As per claims 5, 11 and 22, Kim et al inherently teaches compensating for the difference of the transmitter and receiver I and Q paths using a digital FIR filter (see col.10, lines 25-26).

As per claims 6, 12 and 23, Kim et al inherently teaches utilizing iterative estimation for filter tap parameters during the compensating (see col.10, lines 23-26).

As per claim 13, Kim et al teaches method for estimating IQ path mismatch in a transceiver, the method comprising: measuring a difference in the gain and phase response between transmitter I and Q paths and between receiver I and Q paths of a transceiver (see fig.9 and col.9, lines 40-48) the transmitter I and Q paths sharing a receiver path and the receiver I and Q paths sharing a signal source (see figs. 6 and 7 and page 2 [0015, 0017 and 0022]); compensating for the difference of the transmitter and receiver I and Q paths using a digital FIR filter (see col.10, lines 10-26).

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 3-4, 9-10, 14-17 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Patent No 7,155,180 B2 in view of Chien U.S. Pub No 2004/0203472 A1.

As per claims 3 and 9, Kim et al teaches all the features of the claimed invention except wherein measuring further comprises sending a tone signal and measuring a power and phase shift for all of desired frequency points.

Chein teaches wherein measuring further comprises sending a tone signal (see page 6 [0097], and page 9 [0118]) and measuring a power (see [0110] and phase shift for all of desired frequency points (see page 18 [00234-0235]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Chein into Kim as to perform the magnitude square operation which would be used to estimate intermediate values required to compute the transmitter imbalance as taught by Chein (see [0235]).

As per claims 4 and 10, Kim et al teaches all the features of the claimed invention except measuring further comprises sending uniformly spaced multi-tone white signals, taking a fast Fourier transform (FFT) of a unit period of the uniformly spaced multi-tone white signals, and calculating the response from a power and phase of each tone.

Chein teaches wherein measuring further comprises sending uniformly spaced multi-tone white signals, taking a fast Fourier transform (FFT) of a unit period of the uniformly spaced multi-tone white signals, and calculating the response from a power and phase of each tone (see page 9 [0018-0119] and page 24 [0319]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Chein into Kim as to perform the magnitude square operation which would be used to estimate intermediate values required to compute the transmitter imbalance

as taught by Chein (see [0235]).

As per claims 14-15 and 20-21, Kim et al teaches all the features of the claimed invention except wherein measuring further comprises sending a tone signal and measuring a power and phase shift for all of desired frequency points.

Chein teaches wherein measuring further comprises sending a tone signal (see page 6 [0097], and page 9 [0118]) and measuring a power (see [0110] and phase shift for all of desired frequency points (see page 18 [00234-0235]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Chein into Kim as to perform the magnitude square operation which would be used to estimate intermediate values required to compute the transmitter imbalance as taught by Chein (see [0235]).

As per claim 16, Kim et al inherently teaches utilizing iterative estimation for filter tap parameters during the compensating (see col.10, lines 23-26).

As per claim 17, Kim and Chein in combination would teach comprising performing the measuring and compensating for spectrum efficient modulation to perform the magnitude square operation which would be used to estimate intermediate values required to compute the transmitter imbalance as taught by Chein (see [0235]).

### ***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Green et al U.S. Pub No 2006/0262872 A1 teaches a vector calibration system.

Zheng U.S. Pub No 2004/0002323 A1 teaches a fully integrated self tune image.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571 272 3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

7/31/2007

**EMMANUEL BAYARD**  
**PRIMARY EXAMINER**  
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